

REMARKS

In paragraph 4 of the last office action, independent claim 1 and dependent claim 9 are rejected on the grounds that they are obvious under 35USC103 based on the teachings of U.S. Patent 6,184,504. To overcome this rejection, independent claim 1 is modified by the present amendment to expressly recite two limitations that are not taught or suggested by patent `504.

One particular limitation in claim 1 is that the claim includes "an evaporator" for a liquid refrigerant, and an "electric heater" which has one face that is "connected directly to" said evaporator. An opposite face of the electric heater couples to the IC-chip. In Fig. 1 of the present application, the electric heater is item 20, the evaporator is item 21, and the "direct connection" occurs between those two items 20 and 21. See page 8 of the Detailed Description at lines 13-20.

By comparison, in patent `504, the above limitation is not met. Further, if the system of patent `504 is modified to include the above limitation, the resulting system simply will not work. This point is evident from Figs. 2a and 2b in patent `504.

In Fig. 2a, the component which corresponds to the "evaporator" in claim 1 is item 95. This item 95 has a "temperature regulated surface 100".

Also in Fig. 2a, the component which corresponds to the "electric heater" in claim 1 is item 125 plus the hatched item (that is missing reference number 85). This hatched item has a "heat transfer surface 90", and another surface on this hatched item, which is opposite to the heat transfer surface 90, is in contact with the IC-chip 40.

Inspection of Fig. 2a shows that the "temperature regulated surface 100" of the evaporator is spaced apart from the "heat transfer surface 90". Conversely, in Fig. 2b, the "temperature regulated surface 100" of the evaporator is pushed against the "heat transfer surface 90".

In operation, a controller 115 causes the "heat transfer surface 90" and the "temperature regulated surface 100" to rapidly alternate between the open position of Fig. 2a and the closed position of Fig. 2b. See column 6 at lines 26-31. Thus, the system which patent `504 discloses simply will not work if the surfaces 90 and 100 are "connected directly" together, as claim 1 requires.

A second limitation in claim 1 is that the claim includes "a second feedback circuit means for passing said liquid refrigerant to said evaporator with a variable flow rate that decreases as electrical power usage in said heater increases, and increases as electrical power usage in said heater decreases". One particular example of this claim limitation is shown in Fig. 11. There, curve 41 shows that the heater power varies with time, and curve 45 shows how flow rate of the refrigerant to the evaporator is increased/decreased by the second feedback circuit means in response to the heater power.

By varying the flow rate of the liquid refrigerant to the evaporator as recited in claim 1, electrical power usage in the heater is greatly reduced in comparison to the power usage which will otherwise occur if the flow rate is constant. One specific example of this power savings is shown in Fig. 5-7 wherein power usage in the heater is reduced from 390 watts to 150 watts.

By comparison, in patent `504, there are no components that correspond to the "second feedback circuit means" of claim 1. The office action, on the bottom of page 3, makes particular reference to items 160 and 162. However, item 160 as shown in Figs. 2a and 2b is merely a box that is labeled "heat exchanger", and item 162 as shown in Figs. 2a and 2b is merely a box that is labeled "heat transfer fluid supply".

In the office action, no language is cited from patent `504 re items 160 and 162 as being particularly relevant. And, it is respectfully submitted that no language exists in patent `504 which teaches or suggests that the flow rate of refrigerant to the evaporator should be varied as recited in claim 1. Therefore, the power savings which is achieved by the system of claim 1 is not achieved by the system in patent `504.

Based on the above points of distinction between claim 1 and patent `504, the rejection of claim 1 for obviousness should now be overcome. All of the remaining claims 2-15 are dependent on claim 1 and thereby incorporate the claim 1 limitations, so claims 2-15 also are not obvious.

Also, by this amendment, a second independent claim 16 is added. The language of claim 16 is identical to the language of the above-described claim 1 except that claim 16 calls for "a fluid cooled means" whereas claim 1 calls for "an evaporator for a liquid refrigerant".

The term "fluid cooled means" is broader in scope and includes the "evaporator for a liquid refrigerant" as recited in claim 1, as well as any other fluid cooled heat sink. For example, the term "fluid cooled means" includes

the "heat transfer member 95" that is shown in Fig. 2a in the cited '504 patent.

The office action, on the bottom of page 3, recognizes that the "heat transfer member 95" in patent '504 is not an "evaporator", but says it would have been "obvious for one of ordinary skill in the art" to substitute one heat sink for the other. The present applicants agree with the above position which the office action states, and this is indicated by claim 16.

Next, in paragraph 1 of the office action, claims 3-8 and 10-12 are objected to because of certain "informalities". Each of those informalities will now be addressed.

With regard to claims 3-5, the office action says that the limitation of "said second feedback circuit means senses the instantaneous power to said electric heater" is inaccurate. However, in actual fact, the quoted claim limitation is accurate.

One particular embodiment of the quoted claim limitation comprises components 25, 25a, and 27 in Fig. 1; and the corresponding description of those components is given on pages 11-12. The signal SP_H on conductor 25a selects the amount of power which the power supply 25 sends at any instant to the electric heater. That signal SP_H is also sent to the evaporator control circuit 27 which is part of the second feedback loop. Thus, by the signal SP_H , the second feedback loop senses the instantaneous power to the electric heater.

With regard to claims 6-8 and 10, the office action says the limitation of "said set-point" does not have "any antecedent basis" and therefore is "indefinite".

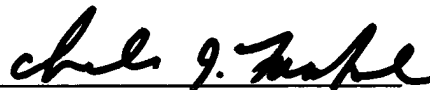
However, in actual fact, the antecedent basis occurs in the second line of claim 1.

With regard to claim 11, the office action says the limitations of "said upper power limit and said lower power limit" has no antecedent. Accordingly, by this amendment, claim 11 is modified to correct the problem.

Lastly, with regard to claim 12, the office action says the limitation of "said average heater power" has no antecedent. Accordingly, by this amendment, claim 12 is modified to correct the problem.

In view of the above remarks, all grounds for rejection and objection in the last office action should now be overcome. Entrance of this amendment and an early Notice of Allowance of claims 1-16 is requested.

Respectfully submitted,



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